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Punishing factors and Chua's conjecture

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Abstract

Let Ω and ∏ be two simply connected domains in the complex plane ℂ which are not equal to the whole plane ℂ. We are concerned with the set A(Ω, ∏) of functions f : Ω → ∏ holomorphic on Ω and we prove estimates for |f(n)(z)|, f ∈ A (ω, ∏), z ∈ Ω, of the following type. Let λ Ω(z) and λ∏(w) denote the density of the Poincaré metric of Ω at z and of ∏ at w, respectively. Then for any pair (Ω, ∏) where Ω is convex, f ∈ A(Ω, ∏), z ∈ Ω, and n > 2 the inequality |f(n)(z)|/n! ≤ (n+1)2n-2 (λΩ(z))n/ λ∏(f(z)) is valid. For functions f ∈ A(Ω, ∏), which are injective on Ω, the validity of above inequality was conjectured by Chua in 1996.

Keywords

Convex domain, Poincaré metric, Simply connected domain, Taylor coefficients